

Amendments to the Claims:

Please amended claims 1, 20, 29, and 35 cancel claims 14 and 25.

- 1 (currently amended) An integrated laser device comprising:
 - a) a pre-distortion circuit fabricated on a monolithic substrate having an input that receives an electrical modulation signal, the pre-distortion circuit generating a pre-distorted modulation signal at an output from the electrical modulation signal; and
 - b) a laser ~~that is integral with and~~ fabricated on the monolithic substrate in close proximity to the pre-distortion circuit ~~in a single device package~~, the laser having an electrical modulation input that is connected to the output of the pre-distortion circuit so that an input impedance of the electrical modulation input of the laser is substantially matched to an output impedance of the pre-distortion circuit, the laser modulating an optical signal with the pre-distorted modulation signal, wherein the pre-distorted modulation signal causes at least some vector cancellation of distortion signals generated when the laser modulates the optical signal.
- 2 (original) The integrated laser device of claim 1 wherein the pre-distortion circuit comprises a shunt-type pre-distortion circuit.
- 3 (original) The integrated laser device of claim 2 wherein the shunt-type pre-distortion circuit comprises a non-linear electronic device.
- 4 (original) The integrated laser device of claim 2 wherein the shunt-type pre-distortion circuit comprises a semiconductor diode.

- 5 (original) The integrated laser device of claim 1 wherein the pre-distortion circuit comprises a first and a second shunt-type pre-distortion circuit.
- 6 (original) The integrated laser device of claim 1 wherein the pre-distortion circuit generates pre-distortion signals that reduce third-order distortion signals that are generated when the laser modulates the optical signal.
- 7 (original) The integrated laser device of claim 1 wherein the pre-distortion circuit generates pre-distortion signals that reduce second-order distortion signals that are generated when the laser modulates the optical signal.
- 8 (original) The integrated laser device of claim 1 wherein the pre-distortion circuit generates pre-distortion signals that reduce temperature dependent distortion signals that are generated when the laser modulates the optical signal.
- 9 (original) The integrated laser device of claim 1 wherein the pre-distortion circuit generates pre-distortion signals that reduce temperature dependent distortion signals that are generated by the pre-distortion circuit.
- 10 (original) The integrated laser device of claim 1 wherein the pre-distortion circuit comprises a bias input that receives a bias signal that controls the vector cancellation of the distortion signals generated when the laser modulates the optical signal.
- 11 (original) The integrated laser device of claim 1 wherein the laser comprises a distributed feedback laser.

12 (original) The integrated laser device of claim 1 wherein the laser comprises an electro-absorption modulated laser.

13 Canceled.

14 Canceled.

15 Canceled.

16 (original) The integrated laser device of claim 1 wherein an output impedance of an amplifier that amplifies the electrical modulation signal is substantially matched to an input impedance of the pre-distortion circuit.

17 (original) The integrated laser device of claim 1 wherein the pre-distortion circuit generates the pre-distorted modulation signal by generating a pre-distortion signal and combining the pre-distortion signal with the electrical modulation signal.

18 (original) The integrated laser device of claim 1 wherein the pre-distorted modulation signal causes vector cancellation of substantially all distortion signals generated when the laser modulates the optical signal.

19 (original) The integrated laser device of claim 1 further comprising an integral transmission line that couples the output of the pre-distortion circuit to the electrical modulation input of the laser, the integral transmission line substantially maintaining an amplitude and a phase response of the pre-distorted modulation signal.

20 (currently amended) An optical source having reduced second-order and third-order distortions, the optical source comprising:

- a) a pre-distortion circuit fabricated on a monolithic substrate having an input that receives an electrical modulation signal, a first bias input that receives a first bias signal, and a second bias input that receives a second bias signal, the pre-distortion circuit generating a pre-distorted modulation signal at an output from the electrical modulation signal, the first bias signal and the second bias signal; and
- b) a laser that is integral with and fabricated on the monolithic substrate in close proximity to the pre-distortion circuit ~~in a single device package~~, the laser having an electrical modulation input that is connected to the output of the pre-distortion circuit so that an input impedance of the electrical modulation input of the laser is substantially matched to an output impedance of the pre-distortion circuit, the laser modulating an optical signal with the pre-distorted modulation signal, wherein the pre-distorted modulation signal causes at least some vector cancellation of second-order distortion signals generated when the laser modulates the optical signal in response to the first bias signal and causes at least some vector cancellation of third-order distortion signals generated when the laser modulates the optical signal in response to the second bias signal.

21 (original) The optical source of claim 20 wherein the pre-distortion circuit comprises a

first shunt-type pre-distortion circuit having an input that receives the first bias signal and a second shunt-type pre-distortion circuit having an input that receives the second bias signal.

22 (original) The optical source of claim 20 wherein the laser comprises a distributed feedback laser.

23 (original) The optical source of claim 20 wherein the laser comprises an electro-absorption modulated laser.

24 Canceled.

25 Canceled.

26 Canceled.

27 (original) The optical source of claim 20 wherein the pre-distorted modulation signal causes vector cancellation of substantially all of the first-order and the second-order distortion signals generated when the laser modulates the optical signal.

28 (original) The optical source of claim 20 further comprising an integral transmission line that couples the output of the pre-distortion circuit to the electrical modulation input of the laser, the integral transmission line substantially maintaining an amplitude and a phase response of the pre-distorted modulation signal.

29 (currently amended) A method of generating a modulated optical signal with reduced second-order and third-order distortions, the method comprising:

- a) generating a first bias signal that is related to second-order distortions generated during modulation;
- b) generating a second bias signal that is related to third-order distortions generated during modulation;

- c) processing an electrical modulation signal with a non-linear electronic circuit that is biased by both the first bias signal and the second bias signal, the non-linear circuit generating a pre-distorted modulation signal;
- d) propagating the pre-distorted modulation signal through a transmission line to a modulation input of a laser monolithically fabricated with the non-linear electronic circuit and having an input impedance that is substantially matched to an output impedance of the non-linear circuit, the transmission line substantially maintaining an amplitude and a phase response of the pre-distorted modulation signal; and
- e) modulating the laser with the pre-distorted modulation signal to generate a modulated optical signal, wherein the pre-distorted modulation signal causes at least some vector cancellation of both the second-order and the third order distortion signals generated during modulation.

30 (original) The method of claim 29 wherein at least one of the first and the second bias signals is related to temperature dependent distortion signals that are generated when the laser is modulated

31 (original) The method of claim 29 wherein the modulating the laser comprises directly modulating the laser.

32 (original) The method of claim 29 wherein the modulating the laser comprises electro-optically modulating the laser.

33 Canceled.

34 (original) The method of claim 29 wherein the pre-distorted modulation signal causes vector cancellation of substantially all of the second-order and the third-order distortion signals generated when the laser is modulated.

35 (currently amended) An optical source comprising:

- a) means for generating a first bias signal that is related to second-order distortions generated during modulation;
- b) means for generating a second bias signal that is related to third-order distortions generated during modulation;
- c) means for non-linearly processing an electrical modulation signal with a non-linear circuit in response to both the first bias signal and the second bias signal to generate a pre-distorted modulation signal;
- d) means for propagating the pre-distorted modulation signal through a transmission line to a modulation input of a laser monolithically fabricated with the non-linear electronic circuit and having an input impedance that is substantially matched to an output impedance of the non-linear circuit, wherein an amplitude and a phase response of the pre-distorted modulation signal are substantially maintained along the transmission line; and
- e) means for modulating a laser with the pre-distorted modulation signal to generate a modulated optical signal, wherein the pre-distorted modulation signal causes at least some vector cancellation of both the second-order and the third order distortion signals generated during modulation.